

REMARKS

Claims 1, 6 and 14-17 are pending in the present application. Claims 1 and 6 are herein amended. Claims 7-8 and 12-13 are herein cancelled. New claims 16-17 have been added. No new matter has been entered.

Rejections under 35 USC §102(b)

Claims 1, 6-8 and 12-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Bun et al. (English Machine Translation of JP 2002-084006 A).

Claim 1 has been amended to recite, among other things, “heating the shaped body to densify solid material in an atmosphere where the void forming agent is not substantially gasified from the shaped body; and then sintering the shaped body at a temperature where the void-forming agent is gasified and removed from the shaped body, thereby producing the sintered body of the thermoelectric conversion material in which continuous electrical conduction paths composed of independent closed pores corresponding to the microparticles or fibrous substance are provided inside the sintered body.” The amendment is supported in the original disclosure of the specification, for example at page 13, lines 7-16.

Similarly, claim 6 has been amended to recite, among other things, “forming the mixture into a shaped body while heating to densify solid material in the shaped body at a temperature where the void-forming agent is not substantially gasified; and then sintering the shaped body at a temperature where the void-forming agent is gasified and removed from the shaped body, thereby producing the sintered body of the thermoelectric conversion material in which

continuous electrical conduction paths composed of independent closed pores corresponding to the microparticles or fibrous substance are provided inside the sintered body." The amendment is supported in the original disclosure of the specification, for example at page 13, lines 19-24.

The Examiner alleged as follows:

BUN et al teaches a thermoelectric material composed of a thermoelectric material and other ingredients, including a void forming agent, employed in the creation of stoma, or pores, as taught in paragraphs 39-41, 44. The powder particles are stated to be less than 1 micron in paragraph 48. The sintering process is described in paragraphs 51 and 52 where a controlled oxidative or reduction process is preferred. Paragraphs 51-53 also address the temperature application of the material for the formation of the pores.

(Office Action, page 3, lines 1-7). However, Bun et al. describes as follows:

[0048]Although the mean particle diameter of these powdered ingredients can be suitably changed according to the presentation of a powdered ingredient, the shape of a final product, etc., usually should just set about 0.05-10 micrometers, preferably 0.1-8 micrometer to more preferably 0.2-6 micrometers.

(Bun et al., paragraph [0048], revised from the original). Here, Bun et al. discusses sizes of the powder material to be sintered. Bun et al. does not discuss the sizes of the void-forming agent as recited in the present invention. Bun et al. also describes as follows:

[0041]As for especially a stoma in this invention, it is preferred that it is a continuation stoma (henceforth a "stoma") containing an independent stoma. In this invention, a continuation stoma mainly consists of an open pore and a closed stoma. It will not be limited especially if it is a range which does not spoil an effect of this invention as the composition.

Formation of a continuation stoma can be attained by adjusting a kind and the amount of addition of an organic binder which are blended with powder materials, for example at the time of manufacture.

(Bun et al., paragraph [0041]). Thus, according to Bun et al., it is preferred that it is a continuation stoma containing an independent stoma. The formation of such stoma is obtained by adjusting a kind and the amount of addition of an organic binder which are blended with

powder materials Bun et al. does not specifically discuss the void-forming agent and its size.

The organic binder referred to in Bun et al. is commonly used material for shaping and is removed in the provisional sintering. The organic binder is not the void-forming agent in the present invention. Regarding the sintering process, Bun et al. describes as follows:

[0051] Then, the acquired forming object is sintered. A sintering method is not restricted in particular, either but can adopt publicly known sintering methods, such as publicly known **** sintering and pressure sintering. What is necessary is for what is necessary to be just to change sintering temperature suitably according to the kind of powder materials to be used, composition, etc., and just to usually let it be the range of about 1000-1700 **. The predetermined characteristic that the target precise nature cannot be attained if sintering temperature is too low, and a sintered compact should possess may not no longer be acquired. Since composition change or change of the detailed structure by grain growth arises if sintering temperature is too high, physical-properties control of a sintered compact not only becomes difficult, but energy expenditure may increase or manufacturing efficiency may fall.

(Bun et al., paragraph [0051]). Thus, Bun et al. indicates that the sintering temperature is determined according to the powder materials to be used, but does not teach or suggest the steps of the present invention. It is noted that Bun et al. also describes as follows:

[0052] A firing environments in particular is not restricted, for example, can be chosen according to the necessity for reduction processing. For example, what is necessary is just to consider it as reducing atmosphere simultaneously with calcination, when reduction processing is required. What is necessary is just to carry out ordinary pressure sintering, for example in the atmosphere, when you do not need reduction processing. The calcination under oxygen environment is effective in controlling oxygen tension, when control of the presentation of a sintered compact, the fine structure, etc. is especially required. In this invention, if it is an oxidizing atmosphere, oxygen tension in particular will not be restricted.

[0053] In this invention, provisional sintering of the forming object may be carried out also in the powder materials compounded by which method if needed in advance of sintering. What is necessary is just to define provisional sintering temperature suitably at a temperature lower than the

sintering temperature in the forming object. Provisional sintering atmosphere as well as the case of the abovementioned sintering can be set up suitably.

(Bun et al., paragraph [0052]-[0053], revised from original). Here, however, Bun et al. discusses provisional sintering, this does not teach or suggest the present invention because nothing Bun et al. indicates performing the heating for densification at a temperature where the void forming agent is not removed from the sintered body.

Thus, Bun et al. does not teach or suggest “heating the shaped body to densify solid material in an atmosphere where the void forming agent is not substantially gasified from the shaped body; and then sintering the shaped body at a temperature where the void-forming agent is gasified and removed from the shaped body, thereby producing the sintered body of the thermoelectric conversion material in which continuous electrical conduction paths composed of independent closed pores corresponding to the microparticles or fibrous substance are provided inside the sintered body,” as recited in claim 1.

Also, Bun et al. does not teach or suggest “forming the mixture into a shaped body while heating to densify solid material in the shaped body at a temperature where the void-forming agent is not substantially gasified; and then sintering the shaped body at a temperature where the void-forming agent is gasified and removed from the shaped body, thereby producing the sintered body of the thermoelectric conversion material in which continuous electrical conduction paths composed of independent closed pores corresponding to the microparticles or fibrous substance are provided inside the sintered body,” as recited in claim 6.

For at least these reasons, claim 1 and 6 patentably distinguish over Bun et al. Claims 14 and 15, depending from either claim 1 or 6, also patentably distinguish over Bun et al. for at least the same reasons. Claims 7, 8 and 12-13 have been cancelled.

New Claims

New claims 16 and 17 have been added. These claims are similar except that the mixture in an oxidizing atmosphere where the void-forming agent is oxidized and removed from the sintered body. These claims are supported in the original disclosure of the specification, for example at page 15, lines 4-11.

In view of the aforementioned amendments and accompanying remarks, Applicant submits that the claims, as herein amended, are in condition for allowance. Applicant requests such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicant's undersigned attorney to arrange for an interview to expedite the disposition of this case.

Application No.: 10/593,556
Art Unit: 1795

Amendment under 37 CFR §1.111
Attorney Docket No.: 062925

If this paper is not timely filed, Applicant respectfully petitions for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,
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